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Organisation Européenne pour des Recherches Astronomiques dans l'Hémisphère Austral
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LA SILLA OBSERVATORY

Engineering (Software)

3.6m M1 Lateral Pad Control Upgrade
Software Design Description

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CHANGE RECORD

Issue	Date	Affected Paragraphs(s)	Reason/Initiation/Remarks
1.4	01/06/2006	All	Some comments added to overview. Man pages, command definitions, error definitions and database structures appendix added.
1.3	10/05/2005	Force Loop Control User Story	Added Force Loop mode requirement
1.2	09/04/2005	All	Updated after user requirements review
1.1	04/03/2005	All	First Approach
1.0	28/02/2005	All	Creation

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1. INTRODUCTION

1.1 PURPOSE

This document contains the software design description for M1 Lateral Pad Control of the 3.6m telescope. The information contained on this document provided the guidelines for the implementation and testing of the new software associated to the project.

The software design presented here is based at the “ESO 360 M1 Lateral Pad Upgrade” [1] user requirements and the technical specification of the current system described at “3.6m + CAT Upgrade Lateral Support System”[2].

This document is oriented to software developers and any other people involved at the 3.6m Lateral Pad Control project. VLT Common Software, UML and Extreme Programming concepts have been introduced during the development of this document therefore is highly required that the reader be acquainted with these topics.

1.2 SCOPE

The present describes the conceptual design of the software contained at e3p6m1 module. The software will be implemented to run on a WS and an LCU. The WS part of the e3p6m1 module will act as coordinator of the high level tasks of the system as long as the LCU part will contain the low level control for the M1 lateral pads software.

1.3 APPLICABLE DOCUMENTS

The following documents, of the exact issue shown, form a part of this document to the extent specified herein. In the even of conflict between the documents referenced herein and the contents of this document, the contents of this document shall be considered a superseding requirement.

[1] 3P6-USR-ESO-90400-0002, Issue 1.0, 23/09/2004 --- ESO 360 M1 Lateral Pad Upgrade
[2] 3P6-TRE-ESO-031-004, Issue 1.1, 21/10/1998 --- 3m6 + CAT Upgrade Lateral Support System

1.4 REFERENCE DOCUMENTS

The following documents are referenced in this document.

[3] VLT-PRO-ESO-10000-0228, 1.0 10/03/93 --- VLT Software Programming Standards
[4] VLT-MAN-ESO-17210-0619, 2.1 21/03/2001 -- Central Control Software User Manual
[5] VLT-MAN-ESO-17210-0770, 1.7 30/09/99 -- Extended CCS User Manual
[6] VLT-MAN-ESO-17210-0771, 1.7 30/09/99 -- CCS Event Tool Kit - EVH User Manual
[7] VLT-MAN-ESO-17210-0707, 1.6 30/09/99 -- CCS On Line Database Loader Manual
[8] VLT-MAN-ESO-17210-2252, 1.0 25/10/2000 --- LCU Server Framework User Manual
[9] VLT-MAN-SBI-17210-0001, 3.6 1/3/2001 --- LCU Common Software User Manual
[10]VLT-MAN-ESO-17210-0600, 1.7 02/10/98 --- CCS-LCU/ Motor Control Module - Part I Application Programmatic & Command Interface User Manual

1.5 ABBREVIATIONS AND ACRONYMS

.
The following abbreviations and acronyms are used in this document:

AUTREP	Automatic Reporting System
CCS	Central Control Software
ECCS	Extended Central Control Software
EVH	Event Handler Toolkit
GUI	Graphical User Interface
HW	Hardware
LSM	La Silla Management
LSO	La Silla Observatory
LCU	Local Control Unit
N/A	Not Applicable
OLDB	On-line Database
PC	Personal Computer
SRS	Software Requirements Specifications
SW	Software
TBC	To Be Confirmed
TBD	To Be Defined
TCS	Telescope Control System
VLT	Very Large Telescope
WG	Working Group
WS	WorkStation

1.6 STYLISTIC CONVENTIONS

The following styles are used:

Bold
: In the text, for commands, filenames, pre-suffixes as they have to be typed.

Italic
: In the text, for parts that have to be substituted with the real content before typing.

`Teletype`
: For examples.

`<name>`
: in the examples, for parts that have to be substituted with the real content before typing.

Bold and *italic* are also used to highlight words.

2. OVERVIEW

The e3p6m1 module shall provide the same functionalities of the current lateral pad control software running on an old PC located at the cage.

The control system shall measure the force at the 21 lateral and the 33 axial pads.
The theoretical pressure for the 21 lateral pads will be computed as a function of the telescope position.
The current telescope position is taken from an inclinometer installed at the telescope and it is completely independent from TCS.
The system will apply the pressure over the 18 non-fixed pads.

A close loop between the theoretical and the real forces applied over the pads is highly desired, therefore the system will compute the theoretical forces to be applied as a function of the telescope position.
The difference between the theoretical forces computed and the real forces measured by the load cells will be regulated in a close loop.

All configuration values will be stored at the OLDB replacing the ASCII files of the current system. Operational and engineering GUIs will be developed according to the requirements described at [1]. The most important information will be available for statistic analysis using AUTREP.

HW safety mechanisms are required to avoid disasters in case of LCU and/or WS failures.

For safety reasons, the system can be operated at normal or degraded modes. Degraded mode will be used when the pressure measured of one or more pads have a value out of the normal range. The numbers of pads to be ruled out in degraded mode can be set from the engineering panel. In case of a major numbers of pads have a wrong pressure value; the telescope cannot be used, because the M1 system will change the telescope status to error.

2.1 Actors

The interaction between the M1 lateral pad system and the actors is showed at the top-level context diagram of the figure 1.

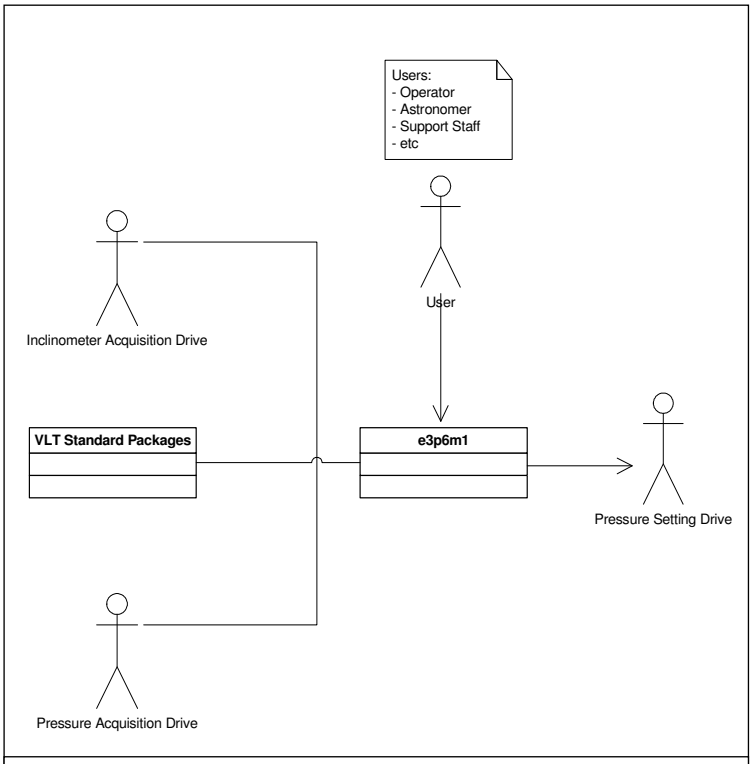


Figure 1: M1 Lateral Pad System Top-level Context Diagram

2.1.1 Inclinometer Acquisition Drive

The inclinometer acquisition driver will deliver the position of the telescope to e3p6m1 software. This sub-system is completely independent from TCS. Electronic Group will develop the HW part and e3p6m1 software shall include the communication interface.

2.1.2 Pressure Acquisition Drive

The pressure acquisition drive will deliver the current pressures applied to the lateral and axial pads. Electronic Group will develop the HW part and e3p6m1 software shall include the communication interface.

2.1.3 Pressure Setting Drive

The pressure setting drive will apply the theoretical pressures to the non-fixed lateral pads. These pressures are computed considering the current telescope position. Electronic Group will develop the HW part and e3p6m1 software shall include the communication interface.

2.1.4 VLT Standard Packages

VLT standard packages provide services to the system e.g. timing, logging, scanning and on-line database operations.

2.1.5 Human Actors

From the software point of view the interaction of human actors with the system is minimal. The major part of the normal operations will be executed automatically each time the LCU is started. Human interaction is concentrate at engineering task and system monitoring, i.e. during the commissioning. The interaction between the actors and the system is through of the graphical user interfaces or CCS messaging system.

3. ARCHITECTURE

The software has been divided at real-time and a coordination parts according to the VLT Standards defined at [3]. The major part of the system shall be implemented as real time application, which be in charge to execute tasks such as, read the pressures of the pads, read the telescope position of the inclinometer, compute and apply the theoretical pressures. These applications will be implemented to run on a LCU and using the . The human interaction with the system will be supported at the WS level. e3p6m1Control process shall be implemented to support WS commands and e3p6m1Server task for LCU commands.

User Stories, Use Case diagrams and Class diagrams have been developed to describe the WS and LCU architectures. The description of the commands accepted by the WS and LCU process, the definition of the classes and the GUIs can be found at the appendix section.

3.1 WS Architecture

The e3p6m1Control process will receive the commands given by the user and will send them to the LCU server process. A minimal set of user commands will be implemented at WS level due to the interaction between human users and the system is minimal. Basically, the user command will be reduced to open/close force loop, set system parameters and the standard commands (init, standby, online).

e3p6m1Control process implementation shall be based on Event Handling Toolkit (EVH) and using services provided by Extended Central Common Software module (ECCS) whenever possible.

3.1.1 User Stories

The WS user stories have been focused to the interaction between human users and the system. Also the GUIs have been considered at WS level.
These stories have been taken directly from [1] and a Use Case diagram has been developed to illustrate each story.

- **Status Display User Story**

A status display with the following information must be provided:

- Air pressure regulator status
- Air pressure
- Inclinometer position
- Angle phi0
- Telescope Angular Speed
- Three mirror position sensor
- Telescope HA
- Lateral pad force control loop status

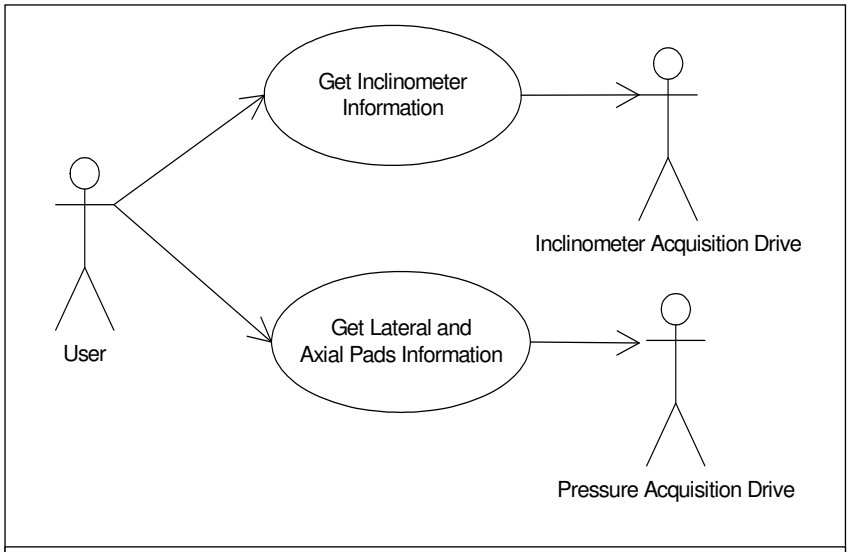


Figure 2: "Status Display" Use Case Diagram

- **Force Loop Control User Story**

The following action buttons must be provided:

- Open/Close the force loop
- Set to Automatic/Manual the force loop

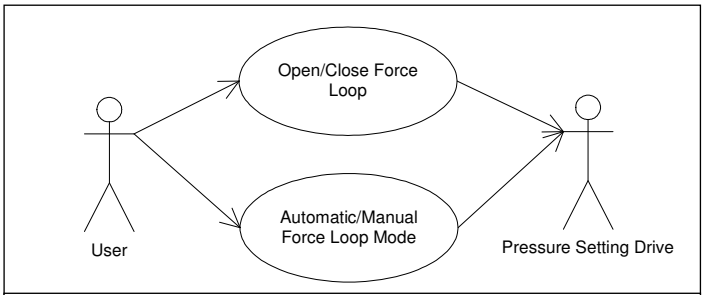


Figure 3: "Force Loop Control" Use Case Diagram

- **Engineering User Interface User Story**

An engineering interface with the following functionalities must be provided:

- Individual lateral pads pressure setting.
- Entry field to set the force and pressure loop parameters such as the number of measurements to compute the real force applied, the frequency of the pressure loop, etc.
- An action button to compute the theoretical forces for the 18 non-fixed pads given the telescope position.
- Display the pressures and forces applied to the lateral and axial pads.

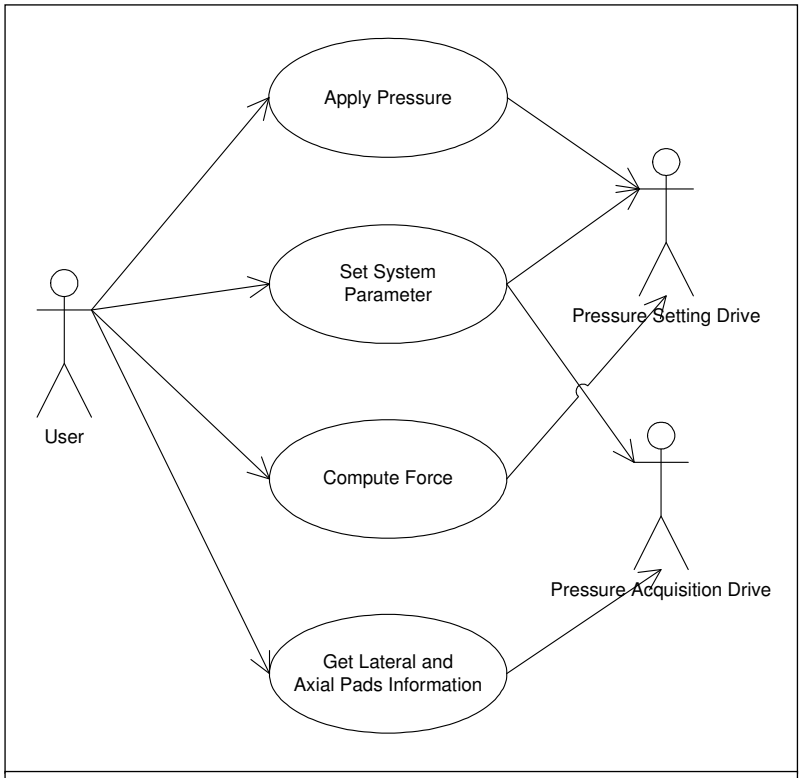


Figure 4: "Engineering User Interface" Use Case Diagram

- **Astatic and Lateral Pad Force Display User Story**

The following info by pad should be displayed:

- Pad identification
- Pressure applied (mb)
- Pressure measured at electron valve sensor (mb)
- Theoretical forces for each lateral and axial pad (kg)
- Force measured for each lateral and axial pad (kg)
- Force deviation for lateral and axial pads (kg)

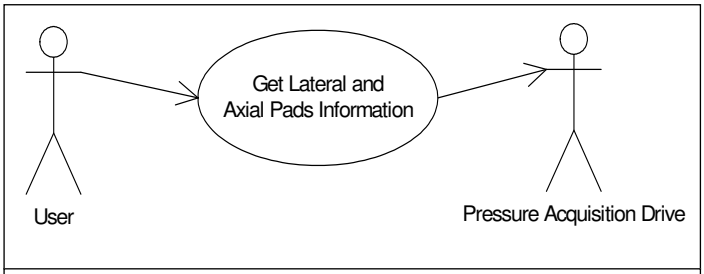


Figure 5: "Astatic and Lat. Pads Force Display" Use Case Diagram

3.1.2 Class Diagram

At the WS level only two classes shall be implemented: e3p6m1CON_STD_COMMANDS, and e3p6m1CON_MAIN_TASK.

e3p6m1CON_STD_COMMANDS is responsible to handle all standard commands which the module receives.

e3p6CON_MAIN_TASK is responsible to coordinate the execution of all M1 WS commands. This class will take the user commands from the standard interface and will send them to the LCU level for their execution.

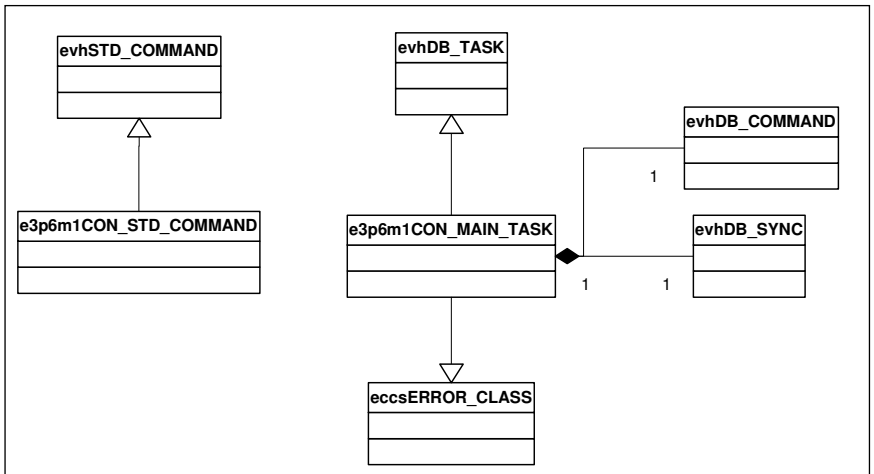


Figure 6: WS Class Diagram

3.2 LCU Architecture

As mentioned before, the major part of the M1 lateral pad control software will be developed at LCU level. The software shall interact with the Lateral and Axial Pad HW, the Inclinometer and the three mirror displacement sensors.

The LCU e3p6m1Server task shall be implemented using LCU Server Framework (LSF) module. It provides skeleton implementation to manage standard command and HW devices such as analog and digital devices, serial communication, etc. The LSF module also allows implementing control software for special devices.

3.2.1 User Stories

- **Air Pad Pressure Regulation User Story**

  - Pressure regulation shall be a function of telescope position given by the inclinometer system. It should be working all the time with time response lower than 2 seconds.
  - Pressure regulation in the operational range should be included at TCS general state.
  - Air pressure should be in the range of 2.8 to 3.2 (bar). If not an alarm must be triggered to move telescope to the zenith.
  - Check that every pad has a pressure value inside the range allowed, otherwise, the system will be set to degraded mode or a telescope error will be released.
  - Air pressure lower than 2.0 (bar) should also activate the mirror clamps system.
  - Constant air pressure should be applied to the pads either after a program crash or during HW/SW start-up. In the first case, last pressure setting must kept until system re-boot.

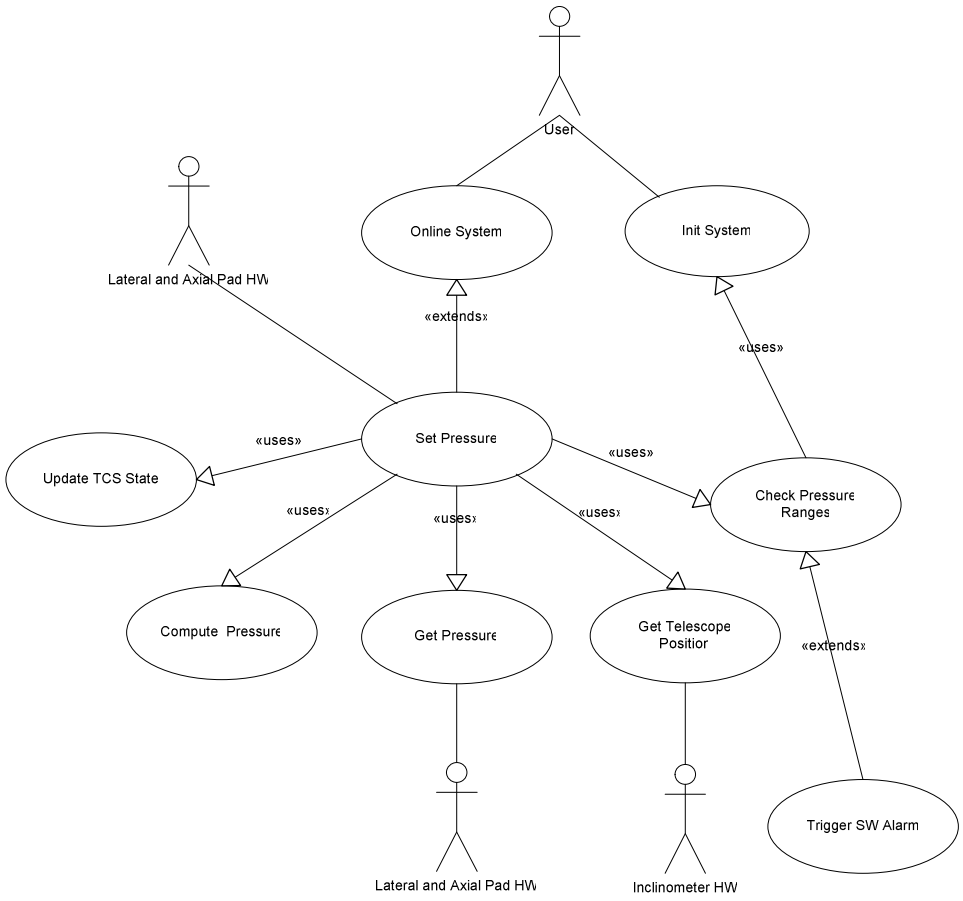


Figure 7: "Air Pressure Regulation" Use Case Diagram

- **Lateral Pad Force Control User Story**

  - Number of measurements to compute the real forces applied must be configurable.
  - Frequency of force loop corrections must be configurable.
  - Forces deviation should be computed with a precision of 0.1%
  - The maximal force by lateral pad should be lower that 24525 (N).

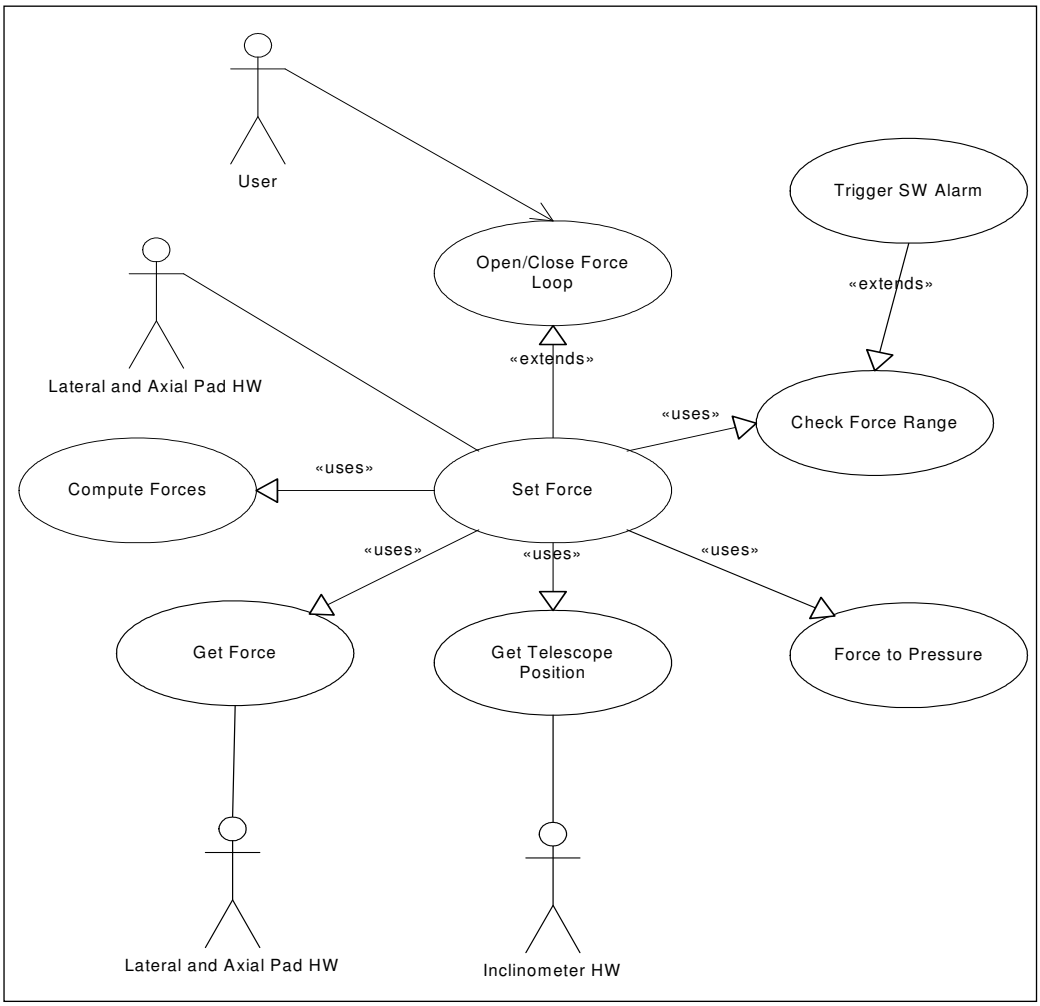


Figure 8: “Lateral Pad Force Control” Use Case Diagram

3.2.2 Class Diagram

At LCU level 9 classes will be implemented: e3p6m1Server, e3p6m1Standard, e3p6m1TaskDev, e3p6m1ControlLoop, e3p6m1ForceLoop, e3p6m1PositionLoop, e3p6m1Monitor, e3p6m1Signal and e3p6m1Serial.

e3p6m1Standard is responsible to handle all standard commands which module receives. e3p6m1Server is in charge to coordinate the execution of all module specified commands.

e3p6m1PositionLoop will implement the LCU tasks for applying to the pneumatic pads the pressure corresponding to the theoretical forces calculated as a function of the telescope position.

e3p6m1ForceLoop will control the pressure applied to the pneumatic pads, the correction will be obtained as a function of the differences between the theoretical forces and the real forces measured at the load cells.

e3p6m1ControlLoop is an abstract class which has been obtained from the application of the “Dependency Inversion Design Pattern Principle”. e3p6m1TaskDev is the base class for the implementation of LCU task applications.

e3p6m1Serial and e3p6m1Signal are the class which provide the software routines to read and write from/to a serial and analog or digital interfaces. These classes will be used to communicate e3p6m1 software with the inclinometer, the lateral pads HW and the displacement sensors.

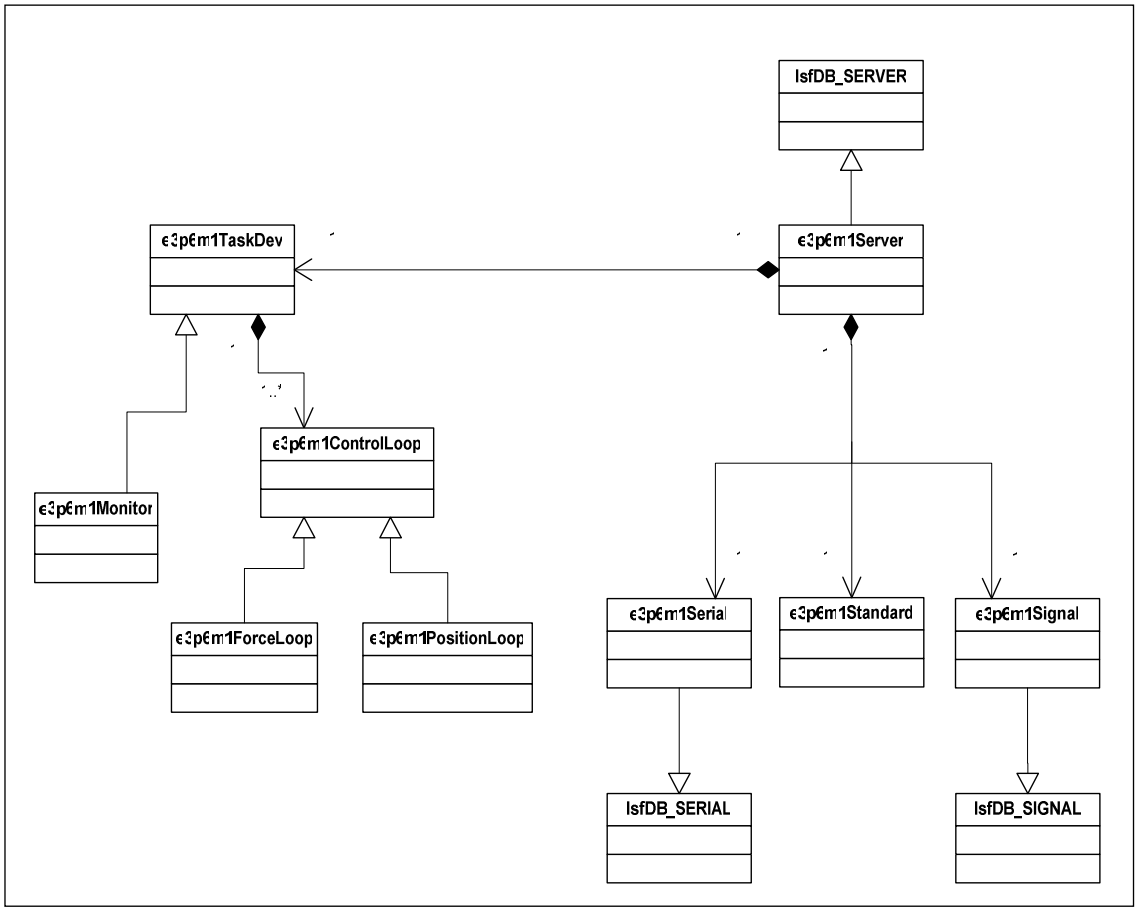
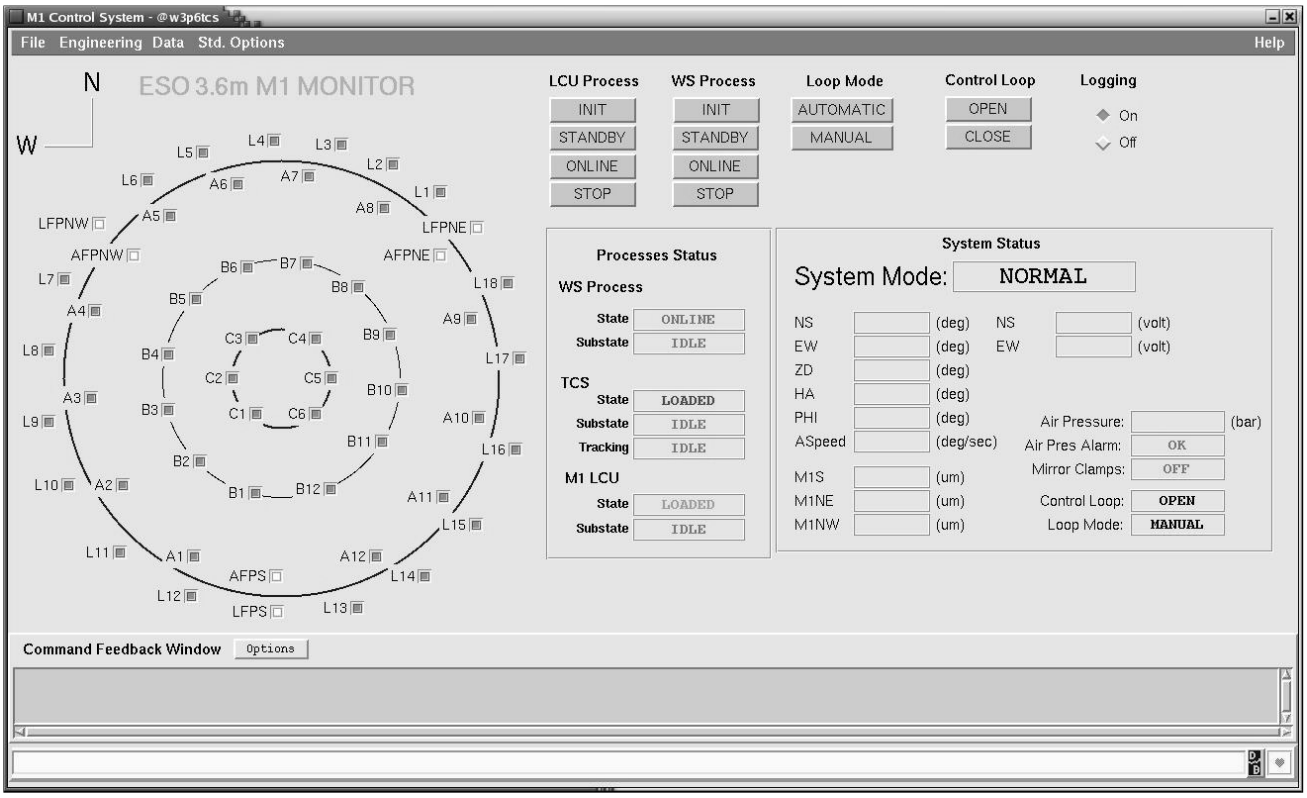


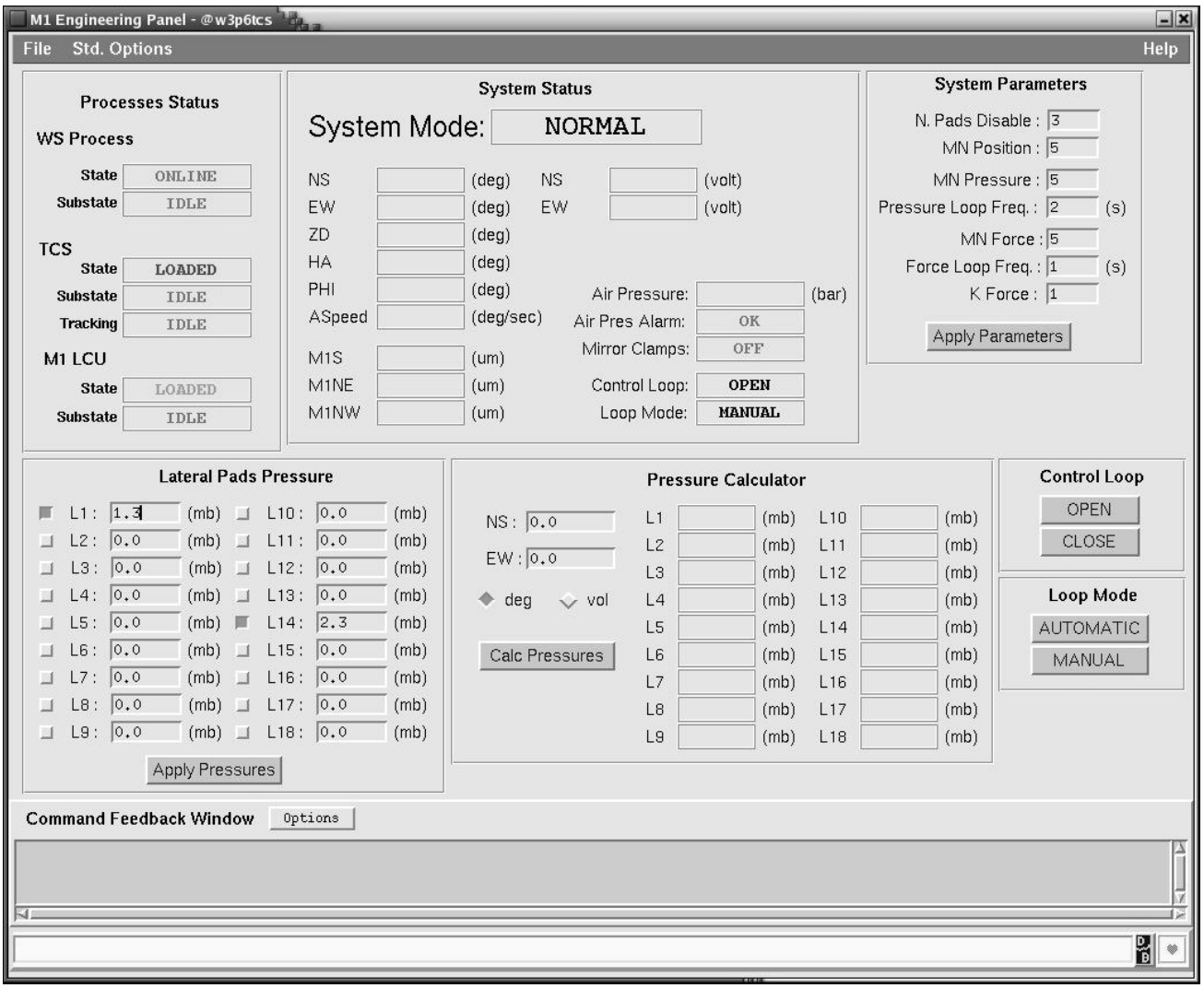
Figure 8: LCU Class Diagram

4. APPENDIX A: GRAPHICAL USER INTERFACES

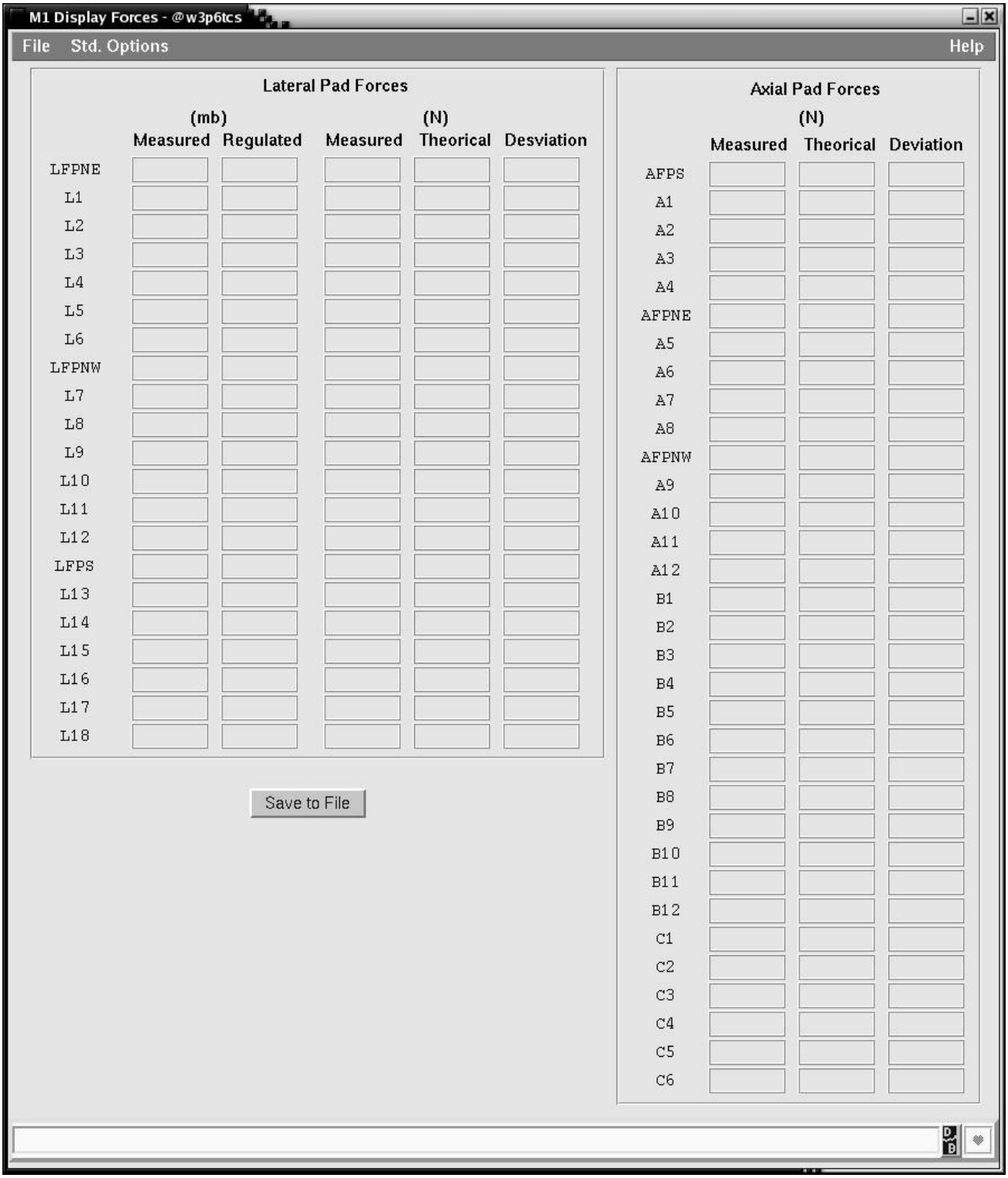
4.1 M1 Main Operations GUI



4.2 M1 Engineering GUI



4.3 M1 Forces and Pressures GUI.



5. APPENDIX B: MAN PAGES

At the moment of the release of this document, both parts of the software (WS and LCU) were under development. Therefore, the information contained on this section is not complete.

5.1 WS Man Pages

5.1.1 e3p6m1Control WS Process

NAME

```
e3p6m1Control - 3.6m Telescope M1 Lateral Pads Workstation Control Process
                Component of the M1 TCS Functional Module
                to receive and handle all user commands
```

SYNOPSIS

```
e3p6m1Control [-r dbRoot] [-n processName]
```

DESCRIPTION

```
The M1 Control Process receives all M1 user commands,
process some of them and distributes other commands to the M1 LCUs
involved at the lateral pad control system.

The optional argument dbRoot is the root point of the TCS packet
DB branch. If omitted it is defaulted to value of the TCS_DBPOINT
environment variable or, if even this not defined, hard-coded
to ":Appl_data:TCS".

The M1 Control Process Workstation sub-branch root point is built
appending the point name "e3p6m1" to the TCS branch name.
The default database point for M1 Control Process for Workstation
is then: ":Appl_data:TCS:e3p6m1".

The optional argument processName is the name under which the
process' instance registers with the CCS and hence the destination
process name for commands to it. If omitted, the instance registers
with CCS with its UNIX process name, as passed by the shell in argv[0].
```

FILES

ENVIRONMENT

```
TCS_DBPOINT specifies the root point of the TCS database branch.
```

COMMANDS

RETURN VALUES

```
0 if everything OK
1 on error
```

CAUTIONS

EXAMPLES

SEE ALSO

BUGS

5.1.2 e3p6m1CON_STD_COMMANDS Class

NAME

e3p6m1CON_STD_COMMANDS - Class to handle standard commands in the e3p6m1Control process.

SYNOPSIS

```
#include "e3p6m1CON_STD_COMMANDS.h"

class e3p6m1CON_STD_COMMANDS : public evhSTD_COMMANDS
 {
   public:
     e3p6m1CON_STD_COMMANDS(const dbSYMADDRESS  dbPoint);

     ~e3p6m1CON_STD_COMMANDS();


     virtual evhCB_COMPL_STAT  StateCB(msgMESSAGE &msg, void *udata);
     virtual evhCB_COMPL_STAT  StatusCB(msgMESSAGE &msg, void *udata);
     virtual evhCB_COMPL_STAT  OffCB(msgMESSAGE &msg, void *udata);
     virtual evhCB_COMPL_STAT  SelfTestCB(msgMESSAGE &msg, void *udata);
     virtual evhCB_COMPL_STAT  TestCB(msgMESSAGE &msg, void *udata);
     virtual evhCB_COMPL_STAT  SimulatCB(msgMESSAGE &msg, void *udata);
     virtual evhCB_COMPL_STAT  StopSimCB(msgMESSAGE &msg, void *udata);
     virtual evhCB_COMPL_STAT  VerboseCB(msgMESSAGE &msg, void *udata);

     vltINT32          GlobalState();
     const char*       GlobalStateName();
     vltINT32          GlobalSubState();
     const char*       GlobalSubStateName();

   protected:

   private:
     const dbSYMADDRESS  dbBasePoint;
     const dbSYMADDRESS  dbControlPoint;

};
```

PARENT CLASS

evhSTD_COMMANDS

DESCRIPTION

This class overload the default behaviour for some standard commands implemented by the base class evhSTD_COMMANDS, in order to meet the specific requirements of the e3p6m1Control process. Also, some of the standard commands are implemented here, in exactly the same way as the default behaviour (taken from evhSTD_COMMMANDS), to allow for easier addition of special behaviour, should this be necessary!

PUBLIC METHODS

```
e3p6m1CON_STD_COMMANDS(const dbSYMADDRESS  dbPoint,
                       const char *version);
```

Initialize the name state table using e3p6m1StateNameMap and load the symbolic address of its parent point, where it is assumed that the "state" and "substate" attributes are.

```
evhCB_COMPL_STAT  StateCB(msgMESSAGE &msg, void *udata);
evhCB_COMPL_STAT  StatusCB(msgMESSAGE &msg, void *udata);
  These two callbacks are used for the STATE and STATUS commands.
  They read the value of the "state" and "substate" attributes in the
  control database point and format the reply to be sent.

evhCB_COMPL_STAT  OffCB(msgMESSAGE &msg, void *udata);
  In this simple first implementation the command just set the local
  state of e3p6m1Control to the requested value.

evhCB_COMPL_STAT  SelfTestCB(msgMESSAGE &msg, void *udata);
evhCB_COMPL_STAT  TestCB(msgMESSAGE &msg, void *udata);
  In this simple implementation the commands just send an OK message
  to the originator, like in the base class.
  They have been overloaded here just to make easier to implement later
  a real behaviour, performing really some test.

evhCB_COMPL_STAT  SimulatCB(msgMESSAGE &msg, void *udata);
evhCB_COMPL_STAT  StopSimCB(msgMESSAGE &msg, void *udata);
evhCB_COMPL_STAT  VerboseCB(msgMESSAGE &msg, void *udata);
  This commands work locally as the base class, setting the database
  corresponding variable to the requested value.

vltINT32          GlobalState();
const char*       GlobalStateName();
vltINT32          GlobalSubState();
const char*       GlobalSubStateName();
  These methods return the index value or the string corresponding to the
  global state and substate of the module.
  They read these value from the attributes that must be in the
  parent point.
```

PUBLIC DATA MEMBERS

PROTECTED METHODS

PROTECTED DATA MEMBERS

PRIVATE METHODS

PRIVATE DATA MEMBERS

```
const dbSYMADDRESS  dbBasePoint;
  Symbolic address of the database parent point
  It is set in the constructor.

const dbSYMADDRESS  dbControlPoint;
  Symbolic address of the database control point, which is assumed have state
  points of application.
  It is set in the constructor.
```

5.1.3 e3p6m1CON_MAIN_TASK Class

NAME

e3p6m1CON_MAIN_TASK - Main class for the e3p6m1Control program

SYNOPSIS

```
class e3p6m1CON_MAIN_TASK : public evhDB_TASK
{
  public:
    e3p6m1CON_MAIN_TASK(const dbSYMADDRESS  &dbPoint);
    ~e3p6m1CON_MAIN_TASK();

    // Callbacks for public commands
    virtual evhCB_COMPL_STAT M1SetLogCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT M1SetModeCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT M1SetLoopCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT M1ConfParamsCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT M1CalcPressCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT M1SetPressCB(msgMESSAGE &msg, void *udata);

    // Callbacks for public commands
    ccsCOMPL_STAT    Recover();
    ccsCOMPL_STAT    Init(evhCALLBACK *okCb = NULL,
                          evhCALLBACK *errorCb = NULL);
    ccsCOMPL_STAT    Init();

    // Overloading of inherited commands
    virtual evhCB_COMPL_STAT ExitCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT InitCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT OnlineCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT StandbyCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT StopCB(msgMESSAGE &msg, void *udata);

   protected:

    virtual evhCB_COMPL_STAT M1CmdOKCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT M1CmdErrorCB(msgMESSAGE &msg, void *udata);
    virtual evhCB_COMPL_STAT GeneralErrorCB(msgMESSAGE &msg, void *udata);

    ccsCOMPL_STAT ExpandCmd(msgMESSAGE &msg);
    evhDB_CMD_SERIAL         *M1Cmd;
    evhDB_CMD_SERIAL         *M1TCSCmd;
    e3p6m1LOG                *log;

  private:
    ccsCOMPL_STAT SubState(const vltINT32 &substate);
    ccsCOMPL_STAT SetStateString(const vltINT32 &state);
    ccsCOMPL_STAT SetSubStateString(const vltINT32 &state);
    ccsCOMPL_STAT CheckSubstate(msgMESSAGE &msg,vltINT32 substate,
                                vltINT32 *valid=NULL);
    ccsCOMPL_STAT Checkstate(msgMESSAGE &msg,vltINT32 state,
                                vltINT32  valid=NULL);
    vltINT32      ReadModSubState();
    vltINT32      ReadModState();
    ccsCOMPL_STAT SaveCurrentSubState();
    vltINT32      ReadPreviousSubState();
    ccsCOMPL_STAT PreviousSubState(vltINT32 substate);

    ccsCOMPL_STAT ErrorState();
    ccsCOMPL_STAT ResetFocusSync();
    vltLOGICAL    ErrorStatus();
```

```
    dbSYMADDRESS    dbBasePoint;
    dbSYMADDRESS    dbDataPoint;
    dbSYMADDRESS    dbControlPoint;
    msgMESSAGE      M1CmdMsg;
    msgMESSAGE      M1CmdTCSMsg;
    vltLOGICAL      loggingFlag;
    vltINT32        M1CmdTimeout;

    vltINT32        errorState;
    vltINT32        previousState;
};
```

PARENT CLASS

evhDB_TASK

DESCRIPTION

An instance of this class is the core of the e3p6m1Control program, which is the main workstation process for the M1 Lateral Pad Control System. All commands for the e3p6m1 module are received by this process.
Some of the commands are processed and then distributed to M1 LCU which performs the Lateral Pad control loop,

When the object is created it registers the callbacks for all the commands. Whenever one of these commands is received, the corresponding callback is called.
The class uses other EVH objects to handle commands.

PUBLIC METHODS

```
e3p6m1CON_MAIN_TASK(const dbSYMADDRESS  dbPoint);
```
The constructor receives as parameter the symbolic address of the online database support point for the object, i.e. the point where the object can find configuration and private run time values. It initialises some internal data, installs all command callbacks, creates the co-operating objects.

```
~e3p6m1CON_MAIN_TASK();
```
The destructor de-registers all callbacks and deletes all objects created.

```
virtual evhCB_COMPL_STAT M1SetLogCB(msgMESSAGE &msg,
                                    void *udata);
```
This callback is called when M1LOG command is received. It sets logging on/off using Logging On/Off methods of e3p6m1LOG class.

```
virtual evhCB_COMPL_STAT M1SetModeCB(msgMESSAGE &msg,
                                     void *udata);
```
This callback is called when M1SETM command is received. It will be used to change the Loop control mode to AUTOMATIC or MANUAL. MANUAL mode allows to send pressure values at every non-fixed lateral pad from the engineering panel.

```
virtual evhCB_COMPL_STAT M1SetLoopCB(msgMESSAGE &msg,
                                     void *udata);
```
This callback is called when M1SETL command is received. It will be used to change the loop mode to OPEN or CLOSE loop. CLOSE loop introduces corrections to the theoretical forces applied.

```
virtual evhCB_COMPL_STAT M1ConfParamsCB(msgMESSAGE &msg,
                                        void *udata);
   This callback is called when M1CONF command is received.
   It performs the set of all M1 configurations parameters such as
   the number of pads to be ruled out at degraded mode, the number
   of measurements to compute the position, pressures and
   forces applied over the pads.

virtual evhCB_COMPL_STAT M1CalcPressCB(msgMESSAGE &msg,
                                       void *udata);
   This callback is called when M1CALC command is received.
   It performs the computation of the pressures to be applied at
   every pad for a given telescope position. The position can be expressed
   at volts or deg. This command only computes the theoretical values
   but they will not be applied.

virtual evhCB_COMPL_STAT M1SetPressCB(msgMESSAGE &msg,
                                      void *udata);
   This callback is called when M1SETPR command is received.
   It will be used to set a theoretical pressure for every pad.
   The format of this command parameters should be <pad value> i.e
   1 0.3 2 0.5 3 0.1.... 18 0.9

virtual evhCB_COMPL_STAT ExitCB(msgMESSAGE &msg,
                                void *udata);
   This callback is called when the EXIT command is received.
   This callback sends the final reply, and thus causes the
   process to really exit.

virtual evhCB_COMPL_STAT InitCB(msgMESSAGE &msg, void *udata);
   This callback is called when the INIT command is received.
   It calls Init to overload the Init method inherited from the
   base class.

virtual evhCB_COMPL_STAT OnlineCB(msgMESSAGE &msg, void *udata);
   This callback is called when the ONLINE command is received.
   If the module is already ONLINE, sends back a reply and returns,
   otherwise it behaves like init.
   Not implemented yet.

ccsCOMPL_STAT    Init()
   This method overloads the Init method inherited from the
   base class. It reads configuration parameters from the data-
   base, and initialises some internal structures and data. It
   also initalize co-operating objects and sets the state of the
   process e3p6m1Control to ONLINE.

ccsCOMPL_STAT    Recover();
   This method is used to try to recover from a severe error.
   The attempt is logged.
   First, the state is set to ERROR, so that interested processes
   can be notified.
   The Init() method is called to reinitialize everything.
```

PUBLIC DATA MEMBERS

None.

PROTECTED METHODS

```
virtual evhCB_COMPL_STAT GeneralErrorCB(msgMESSAGE &msg, void *udata);
   Co-operating objects can trigger this callback when error has
   been occured during their action. The module state is set to error.

virtual evhCB_COMPL_STAT M1CmdOKCB(msgMESSAGE &msg, void *udata);
   This callback is called when a M1 LCU command has
   been performed successfully. No replys is sent back, because
   command handlers had send OK reply already.

virtual evhCB_COMPL_STAT M1CmdErrorCB(msgMESSAGE &msg, void *udata);
   This callback is executed on error or timeout occured when
   executing M1 LCU command.  No replys is sent back, because M1 command
   has been sent by main task, not user. However, the module state is
   set to error state.
```

PROTECTED DATA MEMBERS

```
evhDB_CMD_SERIAL         *M1Cmd;       M1 LCU command object
evhDB_CMD_SERIAL         *M1TCSCmd;    TCS command object
e3p6m1LOG              *log            logging object
```

PRIVATE METHODS

```
ccsCOMPL_STAT SubState(const vltINT32 &substate);
   Sets substate of module to OLDB.

ccsCOMPL_STAT SetStateString(const vltINT32 &state);
   Sets state string of the module to OLDB.

ccsCOMPL_STAT SetSubStateString(const vltINT32 &state);
   Sets substate string of the module to OLDB.

vltINT32 ReadModState();
   This method reads and returns the state of the e3p6m1 module
   from OLDB.

vltINT32 ReadModSubstate();
   This method reads and returns the substate of the e3p6m1 module
   from OLDB.

ccsCOMPL_STAT ErrorState();
   This method sets module to error state. It populates the error
   state also to co-operating classes if populate is set TRUE.
```

PRIVATE DATA MEMBERS

```
dbSYMADDRESS    dbBasePoint      class OLDB root point
dbSYMADDRESS    dbDataPoint      OLDB point where is saved configuration data
                                 of objects
dbSYMADDRESS    dbControlPoint   OLDB point where is saved control data
                                 of objects

msgMESSAGE      M1CmdMsg;        message to construct for M1 LCU command
msgMESSAGE      M1CmdTCSMsg;     message to construct for telescope presets
vltLOGICAL      loggingFlag;     logging status
vltINT32        M1CmdTimeout;    timeout of M1 LCU command and telescope
                                 presets

vltINT32        errorState       error state of the module
```

ON-LINE DATABASE

The class shares an instance of the e3p6m1CONTROL class with e3p6m1CON_STD_COMMANDS

SEE ALSO

EVH(5), evhDB_TASK(4), evhDB_CMD_SERIAL(4), evhDB_SYNC(4),

6. APPENDIX B: COMMAND DEFINITION FILES

At the moment of the release of this document, both parts of the software (WS and LCU) were under development. Therefore, the information contained on this section is not complete.

6.1 WS CDT File (e3p6m1Control.cdt)

```
//------------------------------------------------------------------------
//  ESO VLT              3.6m f/8 M2 WS Control Software
//------------------------------------------------------------------------
//  "@(#) $Id: e3p6m1Control.cdt,v 0.6+ 2006/05/11 16:17:02 vltsccm Exp $"
//------------------------------------------------------------------------
// who       when      what
// --------  --------  ----------------------------------------------
// rsoto   2006-05-06 created.
//
//------------------------------------------------------------------------

//************************************************************************

PUBLIC_COMMANDS

//========================================================================
//  Module specified public commands
//========================================================================

//========================================================================

COMMAND=  M1LOG

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    onOff
    PAR_TYPE=    STRING
    PAR_RANGE=   ENUM "On" , "Off"
    PAR_DEF_VAL= "Off"

REPLY_FORMAT = A

REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Set logging on/off.
@

//========================================================================


COMMAND=  M1SETM

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    value
    PAR_TYPE=    STRING
    PAR_RANGE= ENUM "AUTO" , "MANUAL"
    PAR_DEF_VAL= "AUTO"
```

```
REPLY_FORMAT = A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Set the loop mode, MANUAL mode allows to enter pressures manually from the engineering
panel.
@

//=====================================================================


COMMAND=  M1SETL

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    value
    PAR_TYPE=    STRING
    PAR_RANGE= ENUM "OPEN" , "CLOSE"
    PAR_DEF_VAL= "OPEN"

REPLY_FORMAT = A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Set the control loop to OPEN or CLOSE. CLOSE loop introduces corrections to the forces
applied.
@

//=====================================================================


COMMAND=  M1CONF

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    padDis
    PAR_TYPE=    INTEGER
    PAR_RANGE=   INTERVAL MIN= 0 ;MAX=18

    PAR_NAME=    meanPos
    PAR_TYPE=    INTEGER
    PAR_RANGE=   INTERVAL MIN= 0 ;MAX=5

    PAR_NAME=    meanPress
    PAR_TYPE=    INTEGER
    PAR_RANGE=   INTERVAL MIN= 0 ;MAX=5

    PAR_NAME=    prLoopFreq
    PAR_TYPE=    REAL
    PAR_RANGE=   INTERVAL MIN= 0.0 ;MAX=10.0

    PAR_NAME=    meanForce
    PAR_TYPE=    INTEGER
    PAR_RANGE=   INTERVAL MIN= 0 ;MAX=5
```

```
    PAR_NAME=    frLoopFreq
    PAR_TYPE=    REAL
    PAR_RANGE=   INTERVAL MIN= 0.0 ;MAX=10.0

    PAR_NAME=    kForce
    PAR_TYPE=    REAL
    PAR_RANGE=   INTERVAL MIN= 0.0 ;MAX=1.0

REPLY_FORMAT = A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Set the system parameters.
@

//=====================================================================


COMMAND=  M1CALC

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    nsValue
    PAR_TYPE=    REAL
    PAR_RANGE=   INTERVAL MIN= 0.0 ;MAX=100.0

    PAR_NAME=    ewValue
    PAR_TYPE=    REAL
    PAR_RANGE=   INTERVAL MIN= 0.0 ;MAX=100.0

    PAR_NAME=    unit
    PAR_TYPE=    STRING
    PAR_RANGE=   ENUM "VOL","DEG"
    PAR_DEF_VAL= "DEG"

REPLY_FORMAT = A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Computes the pressure to be applied at every pad for a given inclination. The position can
be expressed at deg o volts .
@



//=====================================================================

COMMAND=  M1SETPR

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    values
    PAR_TYPE=    STRING
    PAR_MAX_REPETITION=999

REPLY_FORMAT = A
```

```
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Set the pressures manually for each pad. This commands can be only used in MANUAL mode of
the loop.
The list of parameters should be <pad> <value>. i.e "1 0.23 2 2.0...18 0.2"
@

//=====================================================================

//=====================================================================
//  Public Standard commands
//=====================================================================

//=====================================================================

COMMAND=  PING

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Get lifesign from e3p6m1 module.
@

//=====================================================================

COMMAND=  STATE

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "ONLINE"

HELP_TEXT=
Get state of e3p6m1 module.
@


//=====================================================================

COMMAND=  STATUS

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "State: ONLINE - Default CMD reply"
```

```
HELP_TEXT=
Get complete status of e3p6m1 module.
@

//*********************************************************************

MAINTENANCE_COMMANDS

//=====================================================================
//  Maintenance Standard commands
//=====================================================================

//=====================================================================

COMMAND=  STOP

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT = A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Stop any action of e3p6m1Control process.
@

//=====================================================================

COMMAND= BREAK

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Stop action on the e3p6m1Control.
@



//=====================================================================

COMMAND= EXIT

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
```

```
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Terminate the process.
@

//=====================================================================

COMMAND= INIT

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Initialize the software and read config parameters.
@

//=====================================================================

COMMAND= KILL

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Kill the process.
@

//=====================================================================

COMMAND= OFF

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Switch to OFF state.
@

//=====================================================================
```

```
COMMAND= ONLINE

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Switch to state IDLE, which is the initial ONLINE state.
@

//=====================================================================

COMMAND= STANDBY

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Switch to STANDBY.
@

//=====================================================================

COMMAND=  VERBOSE

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    onOff
    PAR_TYPE=    STRING
    PAR_RANGE=   ENUM "On" , "Off"
    PAR_DEF_VAL= "Off"

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Switch on or off verbose mode.
@

//=====================================================================

COMMAND=  GETVERB

SYNONYMS=

FORMAT= A
```

```
PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    onOff
    PAR_TYPE=    STRING

HELP_TEXT=
Get the verbose mode.
@

//=====================================================================

COMMAND=  VERSION

SYNONYMS= GetVersion

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "Version: @(#) $Id: e3p6m1Control.cdt,v 0.6+ 2006/05/11 16:17:02 vltsccm
Exp $"

HELP_TEXT=
Get version of e3p6m1 module.
@

//=====================================================================
//     Module specified Maintenance and engineering  commands
//=====================================================================


//=====================================================================
//     Standard test commands
//=====================================================================

COMMAND= SELFTST

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    function
    PAR_TYPE=    STRING
    PAR_OPTIONAL= YES
    PAR_MAX_REPETITION=999


REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Perform a self-test of the software module.
@

//=====================================================================

COMMAND= SIMULAT
```

```
SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Switch on simulation mode.
@

//=========================================================================

COMMAND= STOPSIM

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Switch off simulation mode.
@

//=========================================================================
COMMAND= GETSIM

SYNONYMS=

FORMAT= A

PARAMETERS=

REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    OnOff
    PAR_TYPE=    STRING

HELP_TEXT=
Get  simulation mode.
@

//=========================================================================

COMMAND= TEST

SYNONYMS=

FORMAT= A

PARAMETERS=
    PAR_NAME=    function
    PAR_TYPE=    STRING
    PAR_OPTIONAL= YES
    PAR_MAX_REPETITION=999
```

```
REPLY_FORMAT= A
REPLY_PARAMETERS=
    PAR_NAME=    done
    PAR_TYPE=    STRING
    PAR_DEF_VAL= "OK"

HELP_TEXT=
Perform a complete test of the software module.
@
```

7. APPENDIX C: ERROR DEFINITION FILES

At the moment of the release of this document, both parts of the software (WS and LCU) were under development. Therefore, the information contained on this section is not complete.

7.1 WS Error Definition File.

```
# Version Id. is specified at the end of the file
#
# Error Definition File    Created on  May 24 22:57:01 2006
#
# This file has been generated by a utility
#
#  !!!!!!!!!!!  DO NOT MANUALLY EDIT THIS FILE  !!!!!!!!!!!
#
############################################################

#define e3p6m1ErrOffset 0

1 F e3p6m1ErrOffset
e3p6m1ERR_DB_WRITE : Failed to write database
noHelp
2 F e3p6m1ErrOffset
e3p6m1ERR_DB_READ : Failed to read from database
noHelp
3 S e3p6m1ErrOffset
e3p6m1ERR_CMD_FAILED : Cmd: %.30s Buffer:%.30
noHelp
4 W e3p6m1ErrOffset
e3p6m1ERR_CMD_TIMEOUT : Cmd: %.30s Buffer:%.30
noHelp
5 S e3p6m1ErrOffset
e3p6m1ERR_SEND_REPLY : Error sending  reply to originator
noHelp
6 S e3p6m1ErrOffset
e3p6m1ERR_SEND_OK_REPLY : Command completed, but cannot send reply to originator
noHelp
7 S e3p6m1ErrOffset
e3p6m1ERR_SEND_ERROR_REPLY : Command failed, but cannot send reply to originator
noHelp
8 W e3p6m1ErrOffset
e3p6m1ERR_NOTALLOWED_IN_STATE : Command failed: not allowed in current state: %.20s
noHelp
9 W e3p6m1ErrOffset
e3p6m1ERR_NEW_COMMAND_RECEIVED : Command failed: aborted because new command received
noHelp
10 F e3p6m1ErrOffset
e3p6m1ERR_INIT : Error during Init(): %.80s
noHelp
11 W e3p6m1ErrOffset
e3p6m1ERR_INIT_RECEIVED : Command failed: INIT command received
noHelp
12 F e3p6m1ErrOffset
e3p6m1ERR_FATAL : Fatal error in %.20s. Trying to recover
noHelp
13 F e3p6m1ErrOffset
e3p6m1ERR_RECOVER : Fatal error in %.20s. Cannot recover. Application aborted
noHelp
14 W e3p6m1ErrOffset
e3p6m1ERR_NOT_TRACKING : Command rejected. Telescope is not TRACKING
noHelp
15 W e3p6m1ErrOffset
e3p6m1ERR_NOT_IDLE : Command rejected. Module is not IDLE. Cmd: %.20s
noHelp
16 W e3p6m1ErrOffset
e3p6m1ERR_UNEXPECTED_SUBSTATE : Module is in an unexpected substate: %.20s
```

```
noHelp
17 S e3p6m1ErrOffset
e3p6m1ERR_EXPAND_CMD_BUFFER : Error in command parameters detected
noHelp
18 W e3p6m1ErrOffset
e3p6m1ERR_TOO_MANY_ERRORS : Too many consecutive errors. Stop logging
noHelp
19 S e3p6m1ErrOffset
e3p6m1ERR_OPEN_FILE : Could not open file %.50s
noHelp
20 S e3p6m1ErrOffset
e3p6m1ERR_APPEND_FILE : Could not append to file %.50s
noHelp
21 W e3p6m1ErrOffset
e3p6m1ERR_NOT_ONLINE : Command rejected. Module is not ONLINE. Cmd: %.20s
noHelp
22 S e3p6m1ErrOffset
e3p6m1ERR_START_TIMER : Could not start timer for cyclical corrections.
noHelp
23 F e3p6m1ErrOffset
e3p6m1ERR_INIT_RETRY : Error during Init(). Fix reported problems and INIT again.
noHelp
24 F e3p6m1ErrOffset
e3p6m1ERR_OBJECT_INIT : Error during Initalizing object %.30s
noHelp
25 F e3p6m1ErrOffset
e3p6m1ERR_ACCESS_DATABASE : Error accessing to database.
noHelp
26 S e3p6m1ErrOffset
e3p6m1ERR_SEND_VALUE_REPLY : Command completed, but cannot send value to originator
noHelp
28 F e3p6m1ErrOffset
e3p6m1ERR_INSTRUMENT_NOT_FOUND : Couldn't find instrument: %.20s
noHelp
29 F e3p6m1ErrOffset
e3p6m1ERR_NO_INSTRUMENT : No instrument specified
noHelp
30 W e3p6m1ErrOffset
e3p6m1ERR_OBJECT_NOT_INITIALIZED : Object is not Initialized: %.30s. Try INIT command
first.
noHelp
32 F e3p6m1ErrOffset
e3p6m1ERR_OBJECT_CREATE : Error during creating object %.30s
noHelp
33 S e3p6m1ErrOffset
e3p6m1ERR_ILLEGAL_PARAMETER : Illegal parameter value for %.80s - %.60s
noHelp
41 F e3p6m1ErrOffset
e3p6m1ERR_GET_SYSTEM_TIME : Error when enquiring system time.
noHelp
42 W e3p6m1ErrOffset
e3p6m1ERR_COMMAND_NOT_ALLOWED : Command is not allowed in current state: %.30s.
noHelp
43 S e3p6m1ErrOffset
e3p6m1ERR_SEND_CMD : Error sending command process:%.30s cmd:%.30s buffer:%.30s
noHelp
44 S e3p6m1ErrOffset
e3p6m1ERR_GENERAL : Error during execution. See logMonitor for details.
noHelp
45 F e3p6m1ErrOffset
e3p6m1ERR_BUG : Programming bug: %.40s
noHelp
46 W e3p6m1ErrOffset
e3p6m1ERR_BUSY : Command %.35s rejected, process busy with previous command %.35s
noHelp
47 F e3p6m1ErrOffset
e3p6m1ERR_TEXT : Error: %.35s
noHelp
```

```
56 S e3p6m1ErrOffset
e3p6m1ERR_NOT_IMPLEMENTED_YET : Feature is not implemented yet.
noHelp
57 S e3p6m1ErrOffset
e3p6m1ERR_OBJECT_ERR_STATE : Process in the error state. Try to INIT first.
noHelp
60 W e3p6m1ErrOffset
e3p6m1ERR_SET_LOGGING : Failed to set logging (%.10s)
noHelp
61 W e3p6m1ErrOffset
e3p6m1ERR_WRITE_OPLOG : Failed to write operational logs (%.30s)
noHelp
62 W e3p6m1ErrOffset
e3p6m1ERR_READ_TIME : Failed to read time from OS
noHelp
63 S e3p6m1ErrOffset
e3p6m1ERR_INTERNAL : Software error, contact SW support (%.30s)
noHelp
64 W e3p6m1ErrOffset
e3p6m1ERR_MODULE_ID : Invalid module Id received %.30s instead of soft
noHelp
65 F e3p6m1ErrOffset
e3p6m1ERR_DBREAD : Failed to read database (%.30s)
noHelp
66 F e3p6m1ErrOffset
e3p6m1ERR_DBWRITE : Failed to write database (%.30s)
noHelp
67 W e3p6m1ErrOffset
e3p6m1ERR_PARAMETER : Illegal parameter %.30s
noHelp
68 W e3p6m1ErrOffset
e3p6m1ERR_STATE : Must be in state %.30s
noHelp
69 S e3p6m1ErrOffset
e3p6m1ERR_TIMEOUT : Timeout on %.30s
noHelp
70 W e3p6m1ErrOffset
e3p6m1ERR_MONITOR : monitor task %.30s
noHelp
71 S e3p6m1ErrOffset
e3p6m1ERR_CMD_BUFF_FRMT : Illegal parameter format cmd: %.20s buffer: %.30s
noHelp
#
# "@(#) $Id$"
```

8. APPENDIX D: DATABASE STRUCTURES

At the moment of the release of this document, both parts of the software (WS and LCU) were under development. Therefore, the information contained on this section is not complete.

8.1 e3p6m1BASE.class

```
#ifndef E3P6M1_DBL
#define E3P6M1_DBL
//*************************************************************************
//* E.S.O. - VLT project
//*
//* "@(#) $Id: e3p6m1BASE.class,v 0.6+ 2006/05/11 16:17:01 vltsccm Exp $"
//*
//* who       when      what
//* --------  --------  ----------------------------------------------
//* rsoto   2006-05-06 created
//*

//************************************************************************
//*   NAME
//*
//*
//*   SYNOPSIS
//*
//*
//*   PARENT CLASS
//*
//*
//*   DESCRIPTION
//*
//*
//*   CAUTIONS
//*
//*   EXAMPLES
//*
//*   SEE ALSO
//*
//*   BUGS
//*
//*------------------------------------------------------------------------*/

#include "e3p6m1CONTROL.class"

CLASS  BASE_CLASS e3p6m1BASE_CLASS
BEGIN
      ATTRIBUTE e3p6m1CONTROL Control   //  Control data
END
#endif /*!E3P6M1_DBL*/

// *___oOo___*
```

8.2 e3p6m1CONTROL.class

```
#ifndef E3P6M1_CONTROL_DBL
#define E3P6M1_CONTROL_DBL
//*************************************************************************
//* E.S.O. - VLT project
//*
//* "@(#) $Id: e3p6m1CONTROL.class,v 0.6+ 2006/05/11 16:17:01 vltsccm Exp $"
//*
//* who       when      what
//* --------  --------  ----------------------------------------------
//* rsoto   2006-05-06 created.
//*
//************************************************************************
//*   NAME
//*
//*
//*   SYNOPSIS
//*
//*   PARENT CLASS
//*
//*   DESCRIPTION
//*
//*   CAUTIONS
//*
//*   EXAMPLES
//*
//*   SEE ALSO
//*
//*   BUGS
//*
//*------------------------------------------------------------------------*/
#include "evhSTD_COMMANDS.class"
#include "evhDB_COMMAND.class"
#include "evhDB_CMD_SERIAL.class"

#include "e3p6m1Defines.h"

CLASS evhSTD_COMMANDS  e3p6m1CONTROL
BEGIN
      ATTRIBUTE INT32    substate          0         // substate of the module
      ATTRIBUTE BYTES32  stateString     "ONLINE"    // state string
      ATTRIBUTE BYTES32  subStateString  "IDLE"      // state string
      ATTRIBUTE LOGICAL  loggingFlag       1         // logging flag
      ATTRIBUTE INT32    opMode            1         // Operational mode: 1=Normal
2=Degraded
      ATTRIBUTE INT32    cmdTimeout       60         // timeout for M1 commands
      ATTRIBUTE INT32    errorState        0         // error state


      ATTRIBUTE evhDB_CMD_SERIAL  TcsCmd    // TCS preset object
        BEGIN
          ATTRIBUTE BYTES32     cmd.destination   "trkwsControl"   // process name
        END

      ATTRIBUTE evhDB_CMD_SERIAL  M1Cmd     // M1 command object
        BEGIN
          ATTRIBUTE BYTES32     cmd.destination   "@l3p6m1:e3p6m1Server"   // process name
        END

END


#endif /*!E3P6M1_CONTROL_DBL*/

// *___oOo___*
```

9. APPENDIX F: M1 LATERAL PAD PROJECT SW STATISTICS AND PLANNING

This section provides project statistic so far and estimations for necessary actions to finish this project successfully.

***Following definition is used for 1 FTE: 1 FTE correspond to the man-work of one SOF team member during 1 year. i.e. 52 man-weeks of 26 shifts of 73.5 working hours eac*h**.

Following project states and activities can be identified from software point of view.

1. Analysis & Design
    a. Feasibility study (1.5 shifts)
    b. First approach to design description (1 shift)
    c. Refining of the Design Description (1.5 shifts)
3. Implementation
    a. LCU software (4.5 shifts)
    b. WS software (1.5 shift)
    c. User Graphical Interfaces (1 shift)
    d. e3p6m1 module integration to TCS (0.5 shift)
4. Testing and verification
    a. Design verification tests, includes writing test plan (1 shift)
    b. On-line verification on telescope and writing test report (0.5 shifts)
5. Training and Documentation
    a. Training of operational personnel (0.05)
    b. Writing User/Maintenance Manuals (1 shift)

Total: 14.05 shifts = 0.54 FTE
Done: 2.5 shift = 0.10 FTE
Left: 11.55 shifts = 0.44 FTE

The calculations are made using real or estimated working hours. In practice working 100% for one project is impossible due to SOF support, other projects and activities.

___oOo___